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(56) Documents Cited

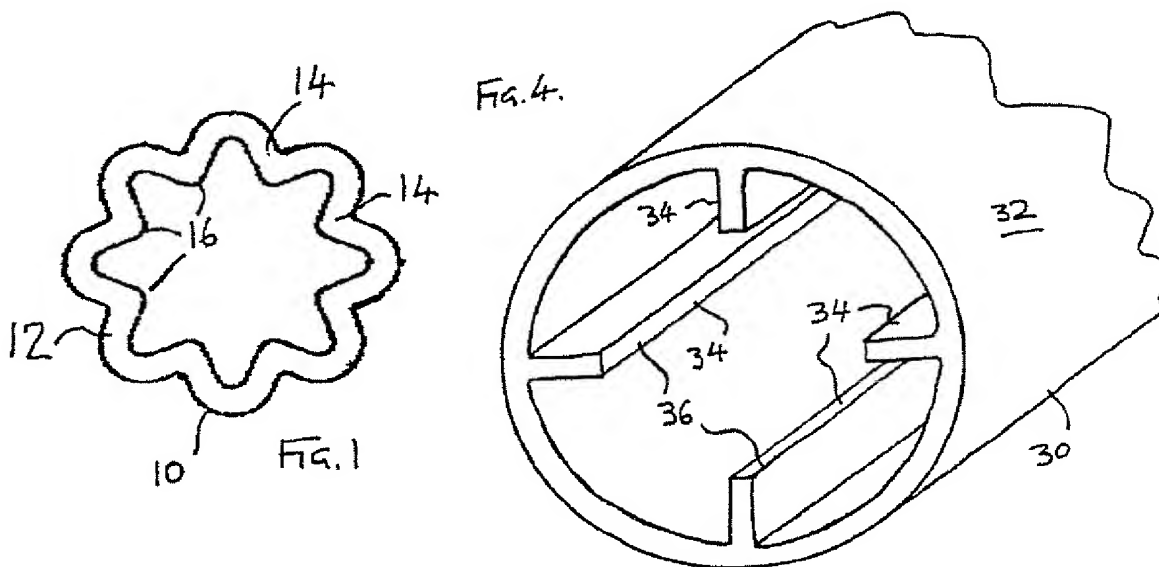
**GB 2203510 A GB 1577946 A GB 1536598 A
GB 1316979 A GB 1252930 A GB 0978280 A**

(58) Field of Search

**UK CL (Edition M) F2H
INT CL⁶ F16B 37/14
ONLINE DATABASES: WPI**

(54) A protector for a screw shank

(57) A protector for the shank of a screw 18 comprises a tube resiliently provided with portions for engaging the shank. The tube may be of concertina form (Figure 1) or have axial ribs 34 (Figure 4). The tube may be made from PVC, silicone, polyethylene or rubber.



At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

The claims were filed later than the filing date within the period prescribed by Rule 25(1) of the Patents Rules 1990.

Fig. 2

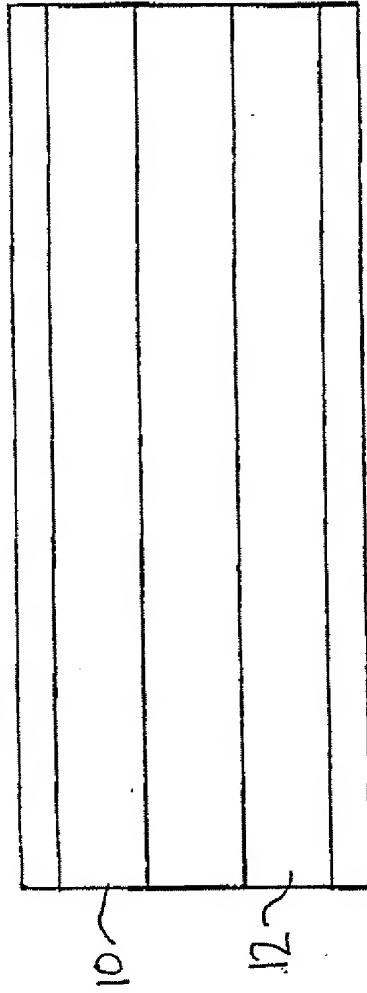


Fig. 3

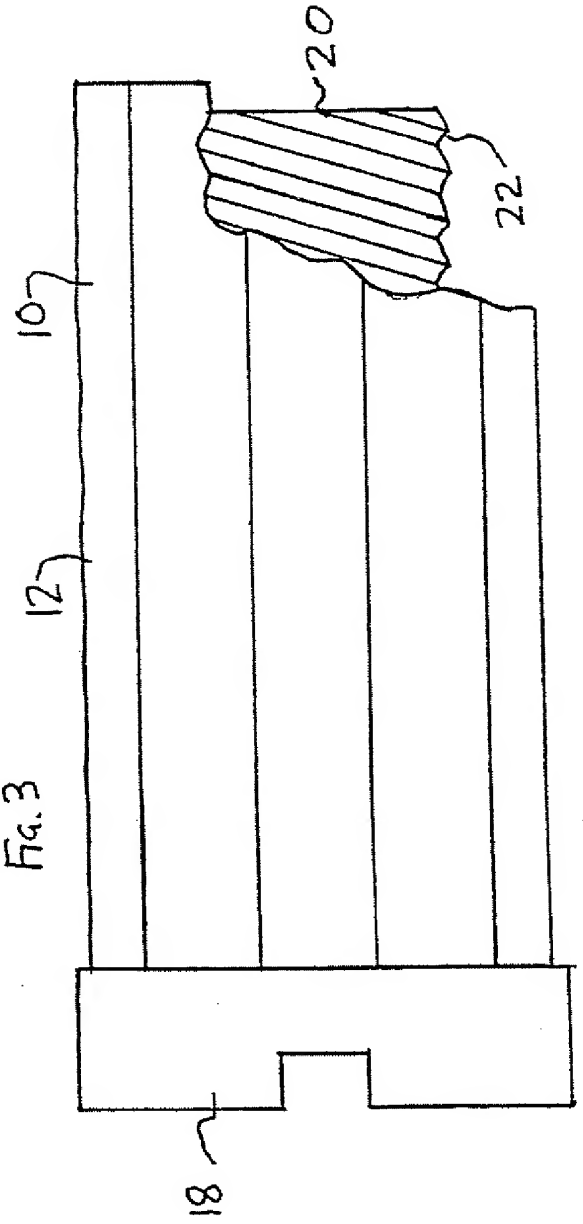


Fig. 1

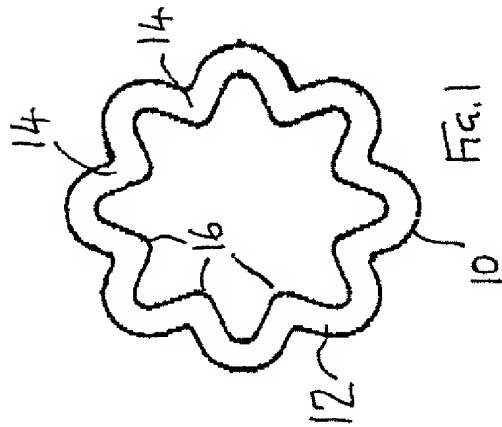
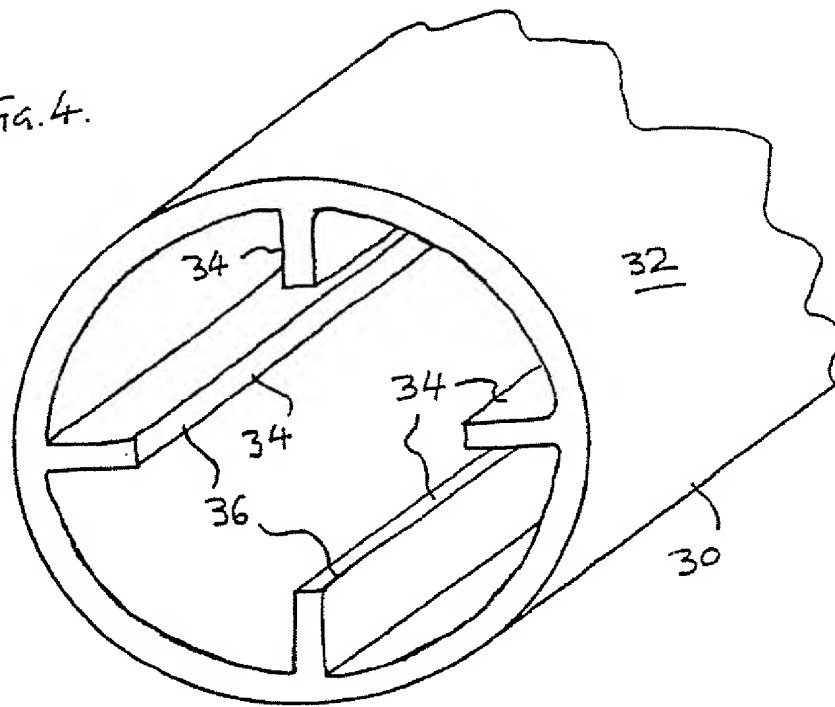


Fig. 4.



A PROTECTOR FOR A SCREW OR THE LIKE

The invention relates to a protector for a screw or the like.

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A known protector for a screw or the like comprises a simple plain cylindrical tube made from resilient material such as thermoplastic rubber which is pushed onto the threaded shank of a screw or stud to protect it. A given protector will only fit one particular diameter of screw or stud. Also, the known protector may be difficult to remove.

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According to the invention there is provided a protector for a screw or the like comprising a tube to lie over the shank of a screw or the like, and portions to contact the shank of a screw or the like, said portions being resiliently provided to be capable of resilient outwards movement.

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As the portions are capable to resilient outwards movement, the protector of the invention can protect screws or the like of different shank diameters. Also, as a protector is in contact with the screw or the like at particular portions rather than the entirety of its inner surface, it is easier to remove.

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The surface of the tube is preferably continuous circumferentially. Complete cover for the shank of the screw or the like is therefore provided.

- 5 Preferably, the tube is resilient to permit outwards movement of the portions. Preferably, the portions are capable of resilient outwards movement over at least 1mm and most preferably between 2mm and 4mm. By providing a movement capability of at least 1mm it is
- 10 ensured that the protector will be able to protect a range of screw diameters and a suitably large range of diameters can be covered by a protector with portions that can move 2mm to 4mm.
- 15 The portions may be spaced over the length of the tube but preferably each portion extends over the length of the tube. Conveniently, the tube may include a longitudinal rotational axis of symmetry.
- 20 In a preferred embodiment, the tube comprises at least one inwards fold and the inner surface of the or each fold comprises a said portion. In this way, opening out of the or a fold will enable a screw or the like of larger diameter to be received in the tube and the
- 25 resilience of the material of the fold will retain the protector. The tube may comprise a plurality of equally spaced inwards folds. The tube may be in

concertina form. Suitably, there may be more than four folds and in a preferred embodiment there are eight folds. The or each inwards fold may be smoothly rounded in profile. Where the tube is in concertina form, the connection of one fold to the next may also be smoothly rounded. Preferably, the or each fold is at least 1mm deep and may be 2mm deep. Suitably, the or each fold may be of uniform thickness which may be 1mm. Where the tube is in concertina form the entire tube may be of uniform thickness.

In an alternative embodiment, at least one projection may project inwardly from the tube and the inner surface of the or each projection may comprise a said portion. The or each projection may be resiliently deformable. The or each projection may comprise an axial rib.

The protector may be made from any suitable material and may be made from PVC, silicone, LDPE or thermoplastic rubber.

Two embodiments of the invention will now be described by way of example and with reference to the accompanying drawings, in which:

Fig. 1 is an end view of the protector of the

first embodiment;

Fig. 2 is a side view of the protector of Fig. 1;

Fig. 3 is a side view of the protector of Fig. 1
on a stud; and,

5 Fig. 4 is a perspective view of the second
embodiment of the protector.

The protector 10 of the first embodiment comprises a
tube 12 of uniform cross-section along its axial
10 length. The tube 12 is also of uniform thickness and
in transverse cross-section has a generally sinusoidal
form comprising eight inwards folds 14 equi-spaced
around the tube 12 and connected to form a continuous
concertina shape. The inner surface 16 at the trough
15 of each fold 14 comprises the aforesaid "portion".

Fig. 3 shows the protector 10 on a screw 18. The
shank 20 of the screw is received in the tube 12 such
that the screw threads 22 of the screw 18 contact the
20 portions 16 and partially open out the inwards folds
14. The shank 20 of the screw is entirely covered by
the protector 10 and it will be seen that the
protector could receive screws with shanks of smaller
or larger diameter in which case the folds 14 would be
25 opened out to a lesser or greater extent. Suitably,
the minimum internal diameter of the tube 12 may be
6.5mm and the maximum external diameter 9.5mm. The

wall thickness of the tube may be 1mm. The tube may be made from PVC, silicone, LDPE or TPR, for example.

Fig. 4 shows the second embodiment in which the protector 30 comprises a cylindrical tube 32 provided on the interior surface with four equi-spaced inwardly projecting rectangular ribs 34. The inner surfaces 36 of the ribs 34 comprise the aforesaid "portions".

In use, the shank of a screw is introduced into the tube 32 and the ribs 34 will deform resiliently to an extent depending upon the diameter of the screw shank. In this way a number of different screw diameters can be accommodated. The protector may be made from PVC, silicone, LDPE or TPR, for example.

The protectors 10 and 30 of the two embodiments may be made by extrusion.

CLAIMS

1. A protector for a screw or the like comprising a tube to lie over the shank of a screw or the like, and portions to contact the shank of a screw or the like, said portions being resiliently provided to be capable of resilient outwards movement.

2. Apparatus as claimed in claim 1, wherein the surface of the tube is continuous circumferentially.

3. Apparatus as claimed in claim 1 or claim 2, wherein the tube is resilient to permit outwards movement of the portions.

4. Apparatus as claimed in any of claims 1, 2 and 3, wherein the portions are capable of resilient outwards movement over at least 1mm.

5. Apparatus as claimed in claim 4, wherein the portions are capable of resilient outwards movement over between 2mm and 4mm.

6. Apparatus as claimed in any preceding claim, wherein each portion extends over the length of the tube.

7. Apparatus as claimed in any preceding claim, wherein the tube includes a longitudinal rotational axis of symmetry.

5 8. Apparatus as claimed in any preceding claim, wherein the tube comprises at least one inwards fold and the inner surface of the or each fold comprises a said portion.

10 9. Apparatus as claimed in claim 8, wherein the tube comprises a plurality of equally spaced inwards folds.

15 10. Apparatus as claimed in claim 9, wherein the tube is in concertina form.

11. Apparatus as claimed in claim 9 or claim 10, wherein there are more than four folds.

20 12. Apparatus as claimed in claim 11, wherein there are eight folds.

25 13. Apparatus as claimed in any of claims 8 to 12, wherein the or each inwards fold is smoothly rounded in profile.

14. Apparatus as claimed in claim 13, wherein

where the tube is in concertina form, the connection of one fold to the next is also smoothly rounded.

15. Apparatus as claimed in any of claims 8 to 14, wherein the or each fold is at least 1mm deep.

16. Apparatus as claimed in any of claims 8 to 15, wherein the or each fold is at least 2mm deep.

17. Apparatus as claimed in any of claims 8 to 16, wherein the or each fold is of uniform thickness.

18. Apparatus as claimed in claim 17, wherein the or each fold is 1mm thick.

19. Apparatus as claimed in claim 17 or claim 18, wherein where the tube is in concertina form, the entire tube is of uniform thickness.

20. Apparatus as claimed in any of claims 1 to 7, wherein at least one projection projects inwardly from the tube and the inner surface of the or each projection comprises a said portion.

21. Apparatus as claimed in claim 20, wherein the or each projection is resiliently deformable.

22. Apparatus as claimed in claim 20 or claim 21,
wherein the or each projection comprises an axial rib.

23. Apparatus as claimed in any preceding claim,
5 wherein the protector is made from PVC, silicone, LDPE
or thermoplastic rubber.

24. A protector for a screw or the like
substantially as described herein with reference to
10 Figs. 1 to 3 or Fig. 4 of the accompanying drawings.

Relevant Technical Fields

- (i) UK Cl (Ed.M) F2H
 (ii) Int Cl (Ed.5) F16B 37/14

Search Examiner
 P M WELLER

Date of completion of Search
 8 DECEMBER 1994

Databases (see below)

(i) UK Patent Office collections of GB, EP, WO and US patent specifications.

Documents considered relevant following a search in respect of Claims :-
 1 TO 24

(ii) ONLINE DATABASES: WPI

Categories of documents

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| <p>X: Document indicating lack of novelty or of inventive step.</p> <p>Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.</p> <p>A: Document indicating technological background and/or state of the art.</p> | <p>P: Document published on or after the declared priority date but before the filing date of the present application.</p> <p>E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.</p> <p>&: Member of the same patent family; corresponding document.</p> |
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Category	Identity of document and relevant passages		Relevant to claim(s)
X	GB 2203510 A	(HYDRA-TIGHT) all figures	1 to 3, 6, 7, 20, 21, 22, 23
X	GB 1577946 A	(TUCKER) all figures; page 1 lines 63 to 70	1, 6, 7, 20 to 23
X	GB 1536598 A	(CHRYSLER) all figures	1 to 3, 6, 7, 20 to 22
X	GB 1316979 A	(ITW) all figures; page 2 lines 17 to 54	1 to 3, 6, 7, 20 to 23
X	GB 1252930 A	(ELTA) Figure 2	1 to 3, 6 to 7, 20 to 23
X	GB 0978280 A	(GM) Figures 2 and 6	1 to 3, 6, 7, 20 to 22

Databases: The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).